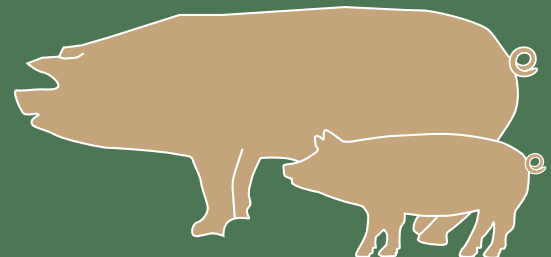
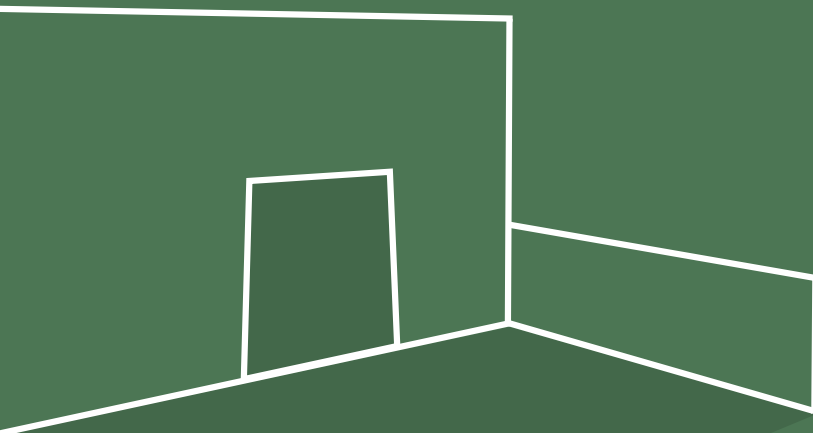




IMPROVING HEALTH AND WELFARE OF PIGS

A handbook for organic pig farmers



This handbook is an outcome of the international CoreOrganic II project «ProPig». www.coreorganic2.org/propig



Project partners



Universität für Bodenkultur Wien
University of Natural Resources
and Life Sciences, Vienna



A sustainable approach to pig husbandry

Organic pig producers face the major challenge to produce pig meat of high quality and at a moderate price based on **high animal health and welfare standards**. To meet this challenge, farmers cannot rely on organic housing and production regulations solely, as these do not inevitably result in a good animal health and welfare status of the pigs.

Rather, animal-friendly and efficient pig production requires the consistent use of all preventive measures in husbandry, hygiene, feeding and management to **prevent development of major diseases, injuries or any type of stress**.

Successful pig production furthermore depends on the farmer's **carefulness and attentiveness** to detect diseases early and on **well-trained and**

motivated persons working with the pigs. For qualified support it is essential that consulted veterinarians or advisors are versed in organic animal husbandry.

As part of the **CoreOrganic II project ProPig** researchers and advisors assessed animal health, welfare and environmental impact on 74 organic pig farms across eight European countries and in different housing systems, including outdoor, indoor and partly outdoor systems. Based on these assessments, improvement strategies were developed together with pig farmers and compiled in this handbook. The recommendations are intended to guide farmers and advisors in developing pig management, housing, and feeding towards optimal animal health and welfare.

A moment a day ...

This handbook is designed to support farmers in their daily work to keep healthy pigs and to recognise potential symptoms early to avoid suffering of the animals.



Proper prevention of diseases requires **daily inspection of all animals**. This can only be done by walking into the pen, getting all animals up to identify lame or sick animals.

Additionally, it is recommended to fix sufficient time (e.g. 1 h each Monday) to check drinkers and spend some effort for positive interaction with the animals (e.g. friendly stroke). This should happen from early life onwards. Special attention should be given to breeding gilts to accustom them to the presence of humans.

This handbook does **not** attempt to diagnose any diseases. Therefore, pig farmers are asked to **call their vet** for proper diagnosis and treatment of diseases.

It can be as simple as ...

5



Easy measures such as a shower on a hot day can improve animal welfare considerably.

How to use this handbook

This handbook summarises the knowledge of farmers, advisors, researchers and existing text books.

The handbook provides useful information and possible measures to address the main challenges of animal health and welfare in organic pig production:

- **Fertility problems**
- **Diarrhoea**
- **Respiratory problems**
- **Injuries**
- **Other health and welfare problems**






Each chapter is divided into subchapters guiding you to different areas, such as feeding, housing, management or treatment.

This handbook is based on simple checklists describing problems and possible countermeasures.

If there is any doubt, please ensure compatibility with your country's organic regulations.

Take the handbook with you into the barn or to the field – it is designed for that!

Symbols which are used:

-  Indicates highly important measures
-  Indicates specific outdoor measures
-  Indicates suggestions for long term solutions
-  Indicates first aid measures
-  Indicates issues of special attention

Fertility Problems

7

Housing

Feeding

Management

Treatment

Fertility Problems – Introduction

8

Fertility is often evaluated by indicators of performance like number of weaned piglets per sow per year, number of live born or weaned piglets per litter. These performance indicators strongly depend on feed, breed, lactation duration and housing system. Therefore, comparisons should only be made within similar systems. In organic agriculture, other indicators may be more important, such as for example:

- Number of weaned piglets during the sow's lifetime
- Number of litters during the sow's lifetime
- Number of weaned piglets per number of live born piglets (survival rate)
- Sow replacement rate (recommended is 25% per year)

How to recognise fertility problems?

Fertility problems can be revealed by low performance and by various symptoms:

- Delay or absence of heat
- Repeat breeders
- Abortions
- Small litters
- Mummified, dead born or weak piglets
- Purulent vulva discharge

Fertility problems are multifactorial and nearly every factor in the sow's environment can be involved. Approximately 70% of fertility problems are due to non-infectious reasons (thermal stress, social stress, transport, hygiene etc.), the rest is caused by infections such as parvovirus or PRRS. It is important to know whether all sows, some groups of sows or only single sows are affected. Good keeping and reviewing of **records** of sows and boars helps to identify possible problem areas.

Fertility Problems – Introduction



1.



2.

1. The basis of individual identification of sows is an easily visible ear tag.
2. Never cut a sow's ear to make it identifiable (it is forbidden).

Fertility Problems – Introduction

Records of all events regarding reproduction help to identify sows with fertility problems. Records can be written on «sow cards» where every event of that individual sow is noted, or in software developed for this purpose. There are even some online applications. Some systems allow identification of the sow by their ear tag recognised by a pocket computer or via the electronic sow feeder. This allows the stockperson to enter and view data directly in the barn beside the animal and, for example, adapt the feeding instantaneously. Use of software will facilitate analysis and evaluation of your records and decision making based on records.

Records to collect around **insemination / mating** and during **gestation**:

- Identity of female
- Dates of heat

- Dates of artificial insemination or natural service
- Reference of the semen or identity of the boar
- Date and result of pregnancy diagnosis
- Date of abortion
- Other observations

Records to collect around **farrowing**:

- Identity of female
- Date of farrowing
- Farrowing assistance
- Number of mummified, dead born and live born piglets
- Date, number and reason of dead piglets
- Number of piglets cross fostered
- Number of weaned piglets
- Date of weaning
- Date, diagnosis and treatment of health problems
- Other observations

Fertility Problems – Sows

Check	Measures
Do you take measures on hot or very cold days?	<ul style="list-style-type: none">✓ If hot, install enough drinkers with high flow rate → p. 38.✓ If hot, provide cooling measures like wallows, showers, air ventilation and enough shade to gilts, sows and boars. Comfort temperature for sows in gestation with adequate bedding varies between about 10–20 °C.✓ If cold, provide sufficient dry bedding material and prevent draughts. <p><i>Why? Hot or very cold temperatures may lead to repeat breeding or abortions (seasonal fertility disorder).</i></p>
Is housing of gilts appropriate?	<ul style="list-style-type: none">✓ If replacement gilts are bought in, they should be placed in a comfortable quarantine area.✓ Use time in quarantine (6 weeks) to do blood tests, to deworm and vaccinate animals if necessary, and to progressively adapt them to the local germs by e.g. exposing them to manure.✓ Allow for regular human contact to facilitate subsequent handling.

Fertility Problems – Sows

12

Check	Measures
Is the service area appropriate?	<ul style="list-style-type: none">✓ Make sure the floor is not slippery.✓ Provide sufficient light and space.✓ Provide an appropriate lying area (sufficient space for all animals, soft, dry and clean bedding, no draught).
Is housing in the farrowing pen appropriate for the sow?	<ul style="list-style-type: none">✓ Move sows to the farrowing pen at least 5 days before presumed birth.✓ Maintain the farrowing area clean and dry, especially around birth. Provide a sufficient amount of straw (min. 2 kg) for nest building behaviour.✓ Avoid excessive ambient temperature (>25 °C) at the sow level, as this would inhibit her appetite and reduce milk production.✓ Follow recommendations in the chapter «piglet mortality» to reduce piglet mortality.



Outdoor

- ✓ Consider using a specially designed service tent to house the boars and give better control of natural or artificial insemination.
- ✓ In hot weather, as well as providing wallows and shades, provide extra ventilation in huts by opening panels in the back or roof.
- ✓ In cold weather, add extra straw in the huts and block any draught holes between hut and ground.
- ✓ In wet weather, make a straw «doormat» at the hut entrance to keep the bedding drier.
- ✓ Insulation of the huts will improve the thermal environment and reduce risk of condensation causing damp bedding.



Insulation of the huts improves thermal environment on cold as well as on hot days.

Fertility Problems – Sows

14



Cooling measures on warm days are essential for a sow's well being and thus also for her fertility.

Check	Measures
Is feeding appropriate for gilts?	<ul style="list-style-type: none">✓ Do not feed gilts like fatteners. Rather use the diet for pregnant sows with a lot of high quality roughages.
Is feeding appropriate for pregnant sows?	<ul style="list-style-type: none">✓ Provide ad libitum lactation feed in the days between weaning and service.✓ Adapt diet and amount of feed during pregnancy according to body condition score. Optimum is a score of 3 at farrowing → p.20.✓ Increase feed in cold weather if necessary to maintain condition.✓ Provide sufficient high quality roughages (no mould, no myco-toxins) to avoid hunger and aggression. Roughages also help to prevent constipation at birth.✓ Cut down feed 2 days before farrowing. Substitute with bran and high quality straw.

Fertility Problems – Sows

16



Outdoor

- ✓ If feeding on the ground, make sure the feed is widely distributed in a dry area of the field.
- ✓ Consider feeding in a long trough to reduce wastage and attraction of birds which might bring diseases.
- ✓ Consider using feeders with lids which can be opened by the pigs but not by birds.
- ✓ Individual lockable feeding stalls ensure that all sows get an adequate amount of food.



1. Feeders with lid protect feed from birds.

2. Simple solutions allow feeding of roughages in barn or on pasture.

Check	Measures
Is feeding sufficient for lactating sows?	<ul style="list-style-type: none">✓ Avoid excessive body condition loss during the suckling period → p. 20. Sows should be fed ad libitum with a palatable diet during the main part of lactation.
Is nutrient content of the diet appropriate?	<ul style="list-style-type: none">✓ Regularly conduct feed analysis and recalculate your ration.✓ Check for sufficient provision of protein, energy, lysine, phosphorus, and calcium, especially during lactation. Equilibrium between nutrients is also important: optimal Ca:P ratio is 1.3:1.
Do sows have round lesions on the shoulder in late lactation?	<ul style="list-style-type: none">✓ Increase quantity (ad libitum) and quality (energy) of feed to avoid excessive thinness.

Fertility Problems – Sows

18

Check

Is your feed and water free of harmful substances?

Measures

- ✓ Ensure high quality of straw during harvest and storage.
- ✓ Analyse your straw and feed for mycotoxins and other harmful substances. They are responsible for a lot of fertility (and other) problems. Roughage should be without mould or dust and it should smell good.
- ✓ Regularly check the flow rate of drinkers (→ p. 38) and analyse annually quality of drinking water (take samples as close as possible to drinkers or from natural water sources being used). Include analyses of *E.coli*, enterococci and coliform bacteria.

Bacteriological water analysis

< 100 total bacterial germs / ml

< 50 coliform bacteria / ml

Chemical water analysis

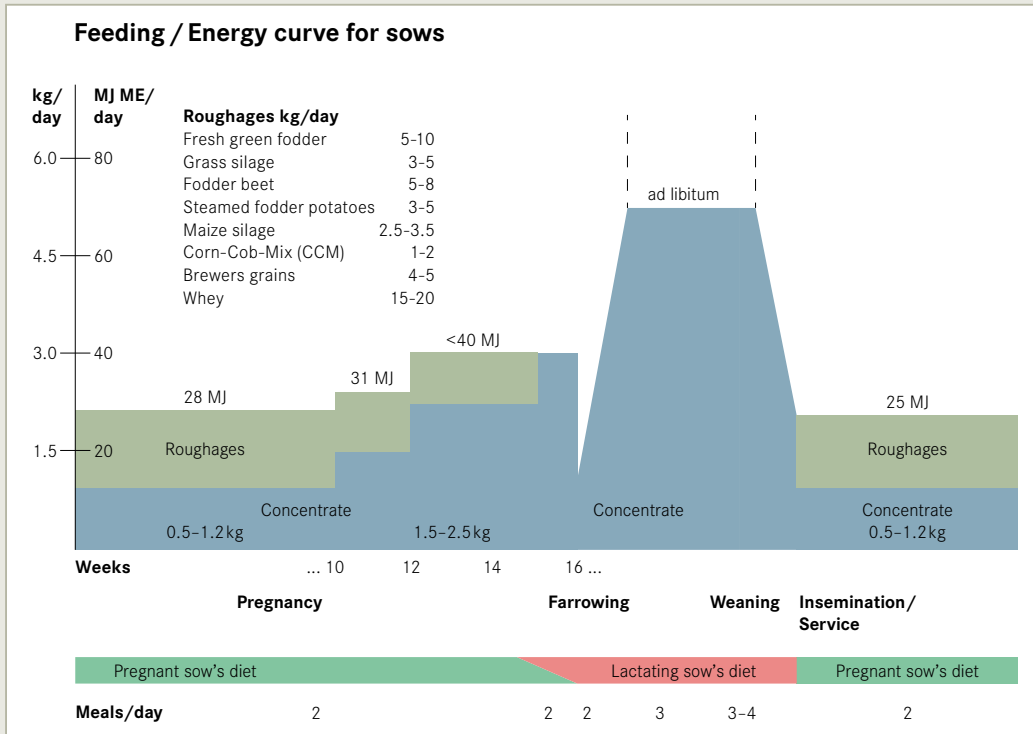
pH at 20 °C: 6.5 to 8.5

Nitrate: < 50 mg / ml

Iron: < 0.3 mg / l

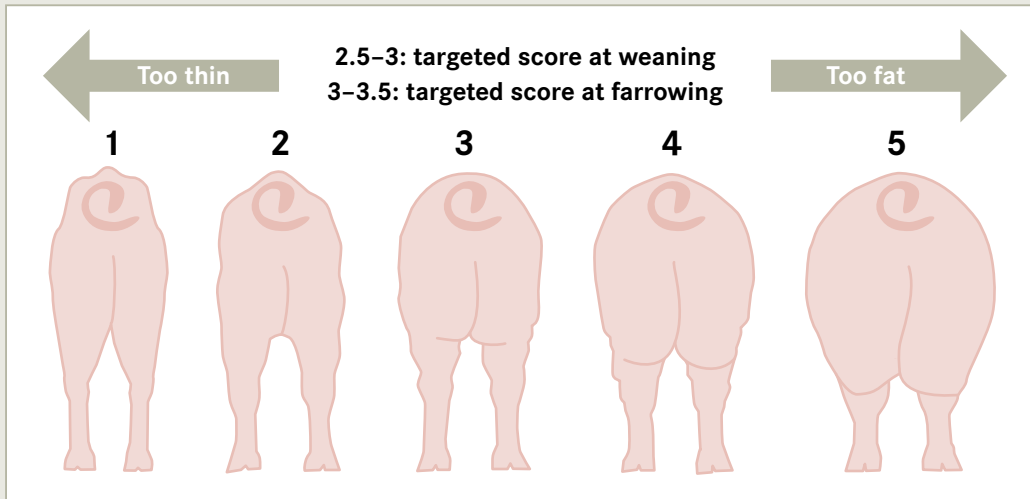
- ✓ Clean water storage tanks regularly.

Fertility Problems – Sows



Fertility Problems – Sows

20



Thin	Score 1 or 2	Ribs, backbone and hip bones are obvious (or are easily detected with pressure).
Moderate	Score 3	Ribs, backbone and hip bones are barely visible (or are barely felt with firm pressure).
Fat	Score 4 or 5	Ribs, backbone and hip bones cannot be seen (or felt even when firm pressure is applied) or fat deposits are clearly visible.

Check	Measures
Is your insemination procedure appropriate?	<ul style="list-style-type: none">✓ Monitor oestrus status of your sows twice a day in the presence of a boar (he will stimulate ovulation and heat expression). Test, if sows stand rigid as a response to pressure on the back.✓ Inseminate 12–24 hours after the first positive back pressure test, then again 12–24 hours later.✓ Store semen in good conditions (temperature between 16 and 18 °C), maintain good hygienic conditions during insemination.
Do you keep a boar?	<ul style="list-style-type: none">✓ Do not use boars for natural service under 7 months of age and older than 3 years.✓ If only natural service is performed, keep one boar for 2–4 sows per batch.✓ Monitor sperm quality, lameness and weight of boars.✓ Perform natural service with the boar for repeat breeders.✓ Do not keep the boar permanently beside the sows or gilts.

Fertility Problems – Sows

22

Check	Measures
Is management of pregnant sows appropriate?	<ul style="list-style-type: none">✓ Either regroup sows with unacquainted sows at weaning or wait until after day 28 of pregnancy.✓ Keep stable groups throughout the production cycle and thus minimise mixing of unacquainted sows.✓ Check for pregnancy by heat detection or ultrasound between days 21 and 30.
Do you observe purulent vaginal discharge after insemination or birth?	<ul style="list-style-type: none">✓ Treat urinary tract infections before insemination.✓ Improve hygiene at insemination. Clean vulva with a dry disposable cloth, do not use water. Use disposable catheters.✓ Improve hygiene when assisting at birth. Clean your hands, arms and sow's vulva. Use disposable gloves and lubricant. Only intervene if necessary.✓ Check with your veterinarian whether treatment is necessary.

Check	Measures
Do you consider fertility when selecting gilts or boars?	<ul style="list-style-type: none">✓ Choose lines without seasonal fertility disorders.✓ Choose lines with reasonable litter size: number of total born piglets should on average not exceed 14.✓ Choose sow lines with good maternal abilities (e.g. nest building, careful lying down, reaction to piglets), good leg and general health and at least 12–14 teats.✓ Choose boar lines with good viability of offspring (e.g. Duroc instead of Pietrain line), good general health, and good leg health.

Fertility Problems – Sows and Boars

24



Outdoor

- ✓ Ensure that the ratio of sows to boars does not exceed 4 : 1 in a group and that all boars are healthy, not lame and not too fat.
- ✓ Run a catch boar in the field with the sows after service to detect any returns to oestrus.



A catch boar in the sow group will detect returns to oestrus.



First aid measures

Call your vet, if you observe one of the following incidents:

- Vulva discharge (purulent or brown, smelly) despite good hygiene at insemination and farrowing.
- Frequent repeat breeders (> 10%).
- Frequent abortions (2 abortions within a couple of weeks).

- Frequent mummies (> 1 % of total piglets) or dead born piglets (> 10 % of total piglets).
- Frequent small litters (< 8 piglets).
- Fever (> 39.3 °C) one day after farrowing and lack of appetite in the days following farrowing in numerous sows (→ chapter on MMA).
- Symptoms of pain of the urogenital system: Contracted belly and curved back.



Aborted fetuses – all same size, quite late pregnancy:
Can be due to stress or infectious disease (e.g. PRRS).

Fertility Problems – Sows and Boars

26



Long term approach

1. Identify possible causes related to feeding, management and housing of reproductive animals → previous pages.
2. Reduce prevalence of lameness, MMA, parasite infestations and other health problems.
3. Check for signs of infections and consult your vet for a diagnosis. Commission analyses of blood samples or dead piglets.



Long term improvement of general health is an important part of fertility measures.

4. Check the vaccination program with your vet. Vaccination against parvovirus of sows /gilts before insemination is recommended (often combined with erysipelas).

Further possible vaccines are against:

- PRRS
- PCV2
- Influenza

Recommendations may differ among regions and farms.

Diarrhoea

27

Housing

Feeding

Management

Treatment

Diarrhoea – Introduction

28

Diarrhoea is very common, especially in suckling and weaning piglets. It may lead to **high mortality rates** due to dehydration. Diarrhoea is a **multi-factorial disease** and can be triggered by many causes. Most often **pathogens** are involved. Different types of viruses and bacteria can colonise different parts of the intestine and impair gut health. Most pathogens are harmful only if the immune system is not able to react properly. It takes several weeks for a pig to acquire a mature **immune system** able to mount its own proper reaction. Sufficient **colostrum** intake (→ chapter on MMA) and good immune quality of the colostrum is essential to supply piglets with antibodies against pathogenic bacteria and viruses.

Special attention at weaning

Weaning occurs in a very sensitive period: Maternally derived passive immunity has decreased since birth, but the piglet's own active immunity is not yet fully developed. Weaning is a shock for piglets in terms of feeding (abrupt change from milk to solid feed rich in cereals), housing (new pen, new pathogen spectrum), and social environment (from mother to group of partially unknown piglets). Therefore, most diarrhoea episodes occur shortly after weaning (approximately within the first 10–14 days).



All measures, which facilitate adaptation during this transition period, will help to reduce diarrhoea incidence!

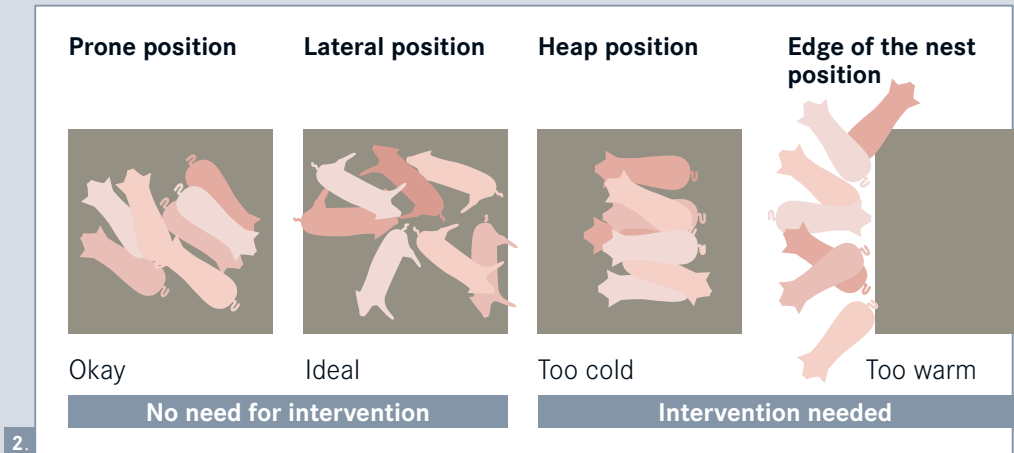
Check	Measures
<p>Do piglets have a suitable creep area?</p>	<ul style="list-style-type: none"> ✓ Provide a warm and dry nest for piglets without draughts. Optimal temperature at floor level is: <ul style="list-style-type: none"> • 30–34 °C (1. week) • 28–30 °C (until weaning) ✓ Close access to the outdoor run, for example with a curtain, to prevent draught. ✓ Provide sufficient dry and clean bedding material. Observe lying behaviour of piglets. They should not be lying in a heap. Illustration → p. 30.
<p>Can piglets socialise with later pen mates?</p>	<ul style="list-style-type: none"> ✓ Allow piglets to have access to other farrowing pens after the first week of life (as long as they are healthy). ✓ Allow group suckling if age difference is less than 1 week. ✓ Keep groups of piglets as stable as possible. <p><i>Why? If piglets know each other when weaned, they have less social stress and are less prone to infections.</i></p>

Diarrhoea – Piglets and Weaners



1.

1. Lying in a heap indicates too low temperatures.
2. A warm nest helps to prevent diseases and is even more important if piglets suffer from diarrhoea!



2.



Outdoor:

- ✓ Use a «fender» to keep piglets close to the farrowing hut initially, but once they start to jump this, remove it so that piglets can socialise with other litters.
- ✓ Provide an adequate depth of clean, dry straw bedding.
- ✓ Block any holes between the hut walls and the ground with mud.
- ✓ Use a curtain at the doorway to reduce heat loss.
- ✓ At weaning, temporarily confine piglets in a hut with a fenced run area for the first week so that they do not wander away seeking their mother and become lost.
- ✓ Have a special «hospital» hut for small piglets who may have difficulty adapting to weaning.



A «fender» keeps piglets in the farrowing hut for the first days of their life.

Check	Measures
Is housing adequate around weaning?	<ul style="list-style-type: none">✓ Keep piglets in the farrowing pen for some days after weaning. This allows them to adapt to the situation.✓ Provide a warm and dry nest for weaners without draughts. Optimal temperature at floor level is:<ul style="list-style-type: none">• 27–29 °C (first week after weaning)• 22–27 °C (afterwards)✓ House pigs in litters or in small groups of less than 20 animals, as they are easier to observe and sick animals are detected more quickly.
Are sick animals separated from the group?	<ul style="list-style-type: none">✓ Separate sick animals from the group.✓ Runts should not be reintegrated into the group. Thus enough «hospital pens» should be available. <p><i>Why? Sick animals and runts often transmit diseases and separation into a pen allows them to have sufficient access to food and water.</i></p>

Check	Measures
<p>Do piglets have continuous access to fresh water?</p>	<ul style="list-style-type: none"> ✓ Ensure a flow rate of the drinkers of 0.8l /min. Check regularly. ✓ Ensure accessibility of drinkers (e.g. height adapted to age). ✓ Check functionality and cleanness of drinkers every day.
<p>Are piglets sufficiently supplied with iron?</p>	<ul style="list-style-type: none"> ✓ Guarantee sufficient supply with iron. Pale skin colour is a sign of iron deficiency. <p><i>Why? Iron is important for blood and immune cells.</i></p>
<p>Do piglets eat enough before weaning (250 g per day)?</p>	<ul style="list-style-type: none"> ✓ Provide piglet feed next to the sow's, so piglets can learn from their mothers' behaviour. ✓ Start to feed early, when piglets are 7–10 days old. ✓ Repeated provision of small amounts of feed enhances attractiveness and taste. <p><i>Why? Sufficient feed intake prepares the animals to eat only solid feed and prepares the digestive tract to digest nutrients from plants.</i></p>

Check	Measures
Are piglets sufficiently supplied with antibodies from colostrum?	<ul style="list-style-type: none">✓ Expose bought-in gilts for some weeks to farm specific bacteria.✓ Ensure that sows are sufficiently supplied with energy.✓ Make sure each piglet gets colostrum straight after birth.



Outdoor

- ✓ Observe the skin colour of the piglets. Additional supply with iron is often necessary, even if piglets have access to soil. Sandy soils have a low iron content.
- ✓ Ensure piglets have an accessible source of clean drinking water.



1. Once piglets start to range from the hut, provide a protected creep feed area which the sows cannot get to and which cannot be spoiled by rain.
2. Simple and cheap solution to protect feed from rain.

Check	Measures
Are weaners fed with an adapted diet around weaning?	<ul style="list-style-type: none">✓ Blend old and new feed steadily for some days before weaning.✓ Restrict amounts of protein and minerals during the first 10 days after weaning to 150 g / kg crude protein and 6 g / kg calcium.✓ Feed may be diluted with components rich in fibres (barley, triticale, oat, wheat bran, hay, silage). Fibre content should be increased around weaning to 5–6%.✓ If suckling piglets were mainly eating from the sow's trough, provide them with the sow's feed for the first days after weaning.

Diarrhoea – Weaners and Finishers

36

Check	Measures
Are pigs provided with feed stuff suitable to decrease stomach pH?	<ul style="list-style-type: none">✓ Provide high quality silage containing lactic acid bacteria and organic acids.✓ Provide probiotics like effective microorganisms or organic yogurt to support digestion.✓ Provide water diluted fruit vinegar.✓ Provide soil or compost for rooting which contain humic acids.✓ Avoid diets with excess buffering capacity (e.g. high calcium).
Do pigs have access to high quality feed?	<ul style="list-style-type: none">✓ Check daily for cleanliness of troughs, eliminate spoiled feed.✓ Check that the nutrient content (minerals, energy, amino acids) of the diet fulfills the nutrient requirements of the pigs that vary with live weight.

Check	Measures
<p>Do weaners have restricted access to feed?</p>	<ul style="list-style-type: none"> ✓ If there are diarrhoea problems on the farm, provide feed to weaners at least in the first 10–14 days post weaning only restrictively in at least 3–5 meals per day. ✓ All weaners should have simultaneous access to restrictive feed. A pipe cut in half can serve as a feed trough, if feeding technique does not allow for all animals eating at the same time. <p><i>Why? Overeating can increase the amount of non-digested nutrients in the stomach which are then used by pathogens, especially E. Coli.</i></p>
<p>Do pigs have continuous access to fresh water?</p>	<ul style="list-style-type: none"> ✓ Check flow rate regularly → p. 38. ✓ Install in weaning pens the same drinker type as in farrowing pens, so that weaners already know the drinker type. ✓ Make sure drinkers are accessible in height. ✓ Check functionality and cleanliness of drinkers every day. ✓ Place additional troughs in the first week after weaning.

Diarrhoea – All Ages

Water

Sufficient and continuous provision of clean water is the best prevention strategy. This is even more important when a group of pigs already has diarrhoea. Drinkers should be adapted to the age category and installed on slats to avoid wet areas in the pen. If possible drinkers should be installed outdoors (attention: frost!) because pigs tend to urinate in wet places. Install at least **1 drinker per 10 animals and at least 2 drinkers per pen**. Clean the water pipes regularly, e.g. with 0.2% fruit vinegar, formic or citric acid.



1.



2.



Check functionality and cleanliness of drinkers daily. Annually analyse water quality → p. 18.

Would you drink this water?

	Flow rate (litres/min)	Daily demand (litres/animal)
Suckling piglets	0.4–0.5	0.7–1
Weaners	0.5–0.7	1–3
Fatteners (<50 kg)	0.6–1	3–6
Fatteners (50–80 kg)	0.8–1.2	5–9
Fatteners (80–120 kg)	1.5–1.8	8–11
Pregnant sows	1.5–1.8	15–20
Lactating sows	2.5–3	20–35

1. Regularly check the exact flow rate of the drinkers.
2. Bowl drinkers comply with natural drinking behaviour, but are more prone to contamination.



General hygiene guidelines

- Perform work routine «from smallest to biggest», starting with lactating sows and suckling piglets followed by weaners, fatteners and pregnant sows.
- Minimise the introduction of new animals and restrict access to people.
- Keep newly bought animals in a quarantine area.
- If necessary install hygiene measures like shower, footbath and handwash before entering the barn.
- Perform batch farrowing and all-in-all-out management.
- Clean pens with high-pressure cleaners, allow for sufficient drying and an empty period of at least 4 days.
- Disinfect pens if there are known pathogens in the barn. Disinfection can be performed with steam or disinfectants compatible with organic standards.
- Remove old or mouldy food under and in troughs.
- Control flies and rodents which are often vectors for pathogen transmission.



Outdoor

- ✓ Rotate farrowing and weaner paddocks regularly to reduce pathogen and parasite infestation.
- ✓ Clean and move the huts within the paddocks between each batch of pigs.
- ✓ Avoid introduction of diseases from wildlife by using bird proof plastic curtains in front of the hut, lidded hoppers for food and (electric) fences.

Diarrhoea – Sows and Piglets

40

Check	Measures
Is the chain of infection sufficiently interrupted before farrowing?	<ul style="list-style-type: none">✓ Clean pens after every batch with a high-pressure cleaner. Allow for drying and a pig-free period of at least 4 days.✓ Shower the sows with warm water before moving them to the farrowing pen. Clean carefully also ears, claws, legs and teats.✓ Keep pens clean and dry, especially after birth.
Do pigs have a sufficiently working immune system when weaned?	<ul style="list-style-type: none">✓ Ensure sufficient intake of colostrum by all piglets. Do not separate them before 12 hours.✓ Prolong suckling period to at least 49 days. <p><i>Why? Piglets weaned at 49 days or later have less diarrhoea and need less treatment than when weaned at 42 days.</i></p>



First aid measures

- Make sure there is unlimited fresh water in every pen.
- Provide electrolyte solution in a trough.
- Add 1 % kaolinite clay to the diet. It will serve as a «digestive bandage» and alleviate symptoms.
- Pigs which suffer from diarrhoea should be fed restrictively several times a day in small amounts. Additionally high quality hay or silage may be provided.
- Provide a warm lying area for the piglets.
- Don't spread the germs to other pens.

Call your vet if:

- Piglets show diarrhoea on two subsequent days without responding to treatment.
- You discover a new type of diarrhoea or a new age group is affected.

Why? The vet can take samples to identify the bacteria and to perform an antibiogram (identifies effective antibiotics).

The whole course of treatment should be finished, even if animals show signs of improvement. Otherwise there is high risk of resistance development. Treatment of individual animals is preferred to group treatment in most cases.

Electrolyte solutions

according to WHO: 1 l Water, 20 g Glucose, 3.5 g Salt, 2.5 g Sodium hydrogen carbonate (food soda), 1.5 g Potassium chloride

or: Water with 20 g / l dextrose and 4 g / l salt



Long term approach

1. Identify possible causes related to feeding, management and housing of suckling piglets, weaners and fatteners
→ previous pages.
2. Integrate young sows or bought-in animals into the herd at least 6–8 weeks before farrowing.
3. If parasitological analysis of faeces is positive for endoparasites, deworm sows 2 weeks before farrowing.
4. If necessary vaccinate the sows during pregnancy. Vaccination programme should be discussed with the vet and adapted to the barn's own pathogen spectrum. Vaccinations of sows and piglets are possible against
 - *E.coli*
 - *Clostridium perfringens* Type C and Type A
 - *Salmonella*
 - *Lawsonia intracellularis*



Why? Sows produce antibodies against pathogens with which they have been confronted and transfer these to piglets in colostrum. Confrontation with the herds own pathogen spectrum as well as vaccination has this effect.

Diarrhoea faeces is altered in colour and /or consistency and /or smell.

Taking samples

If you suspect infections, take samples and involve your veterinarian.

Take fresh faeces samples with a swab from the rectum of pigs which have just become sick. In pigs which have already been sick for some days you will also find secondary pathogens.

Other sampling methods are blood (by your veterinarian) or dead piglets.

Eradication

In some cases, if very severe or persistent pathogens are present or if national regulations require to do so, an eradication /depopulation of the whole herd may be appropriate. Clean and disinfect pens and allow sufficient drying. Depending on pathogens (e.g. *Brachyspira hyodysenteriae*) a disinfection of all pipes and manure storage containers will be necessary.

Phytherapeutic recipe against enteritis

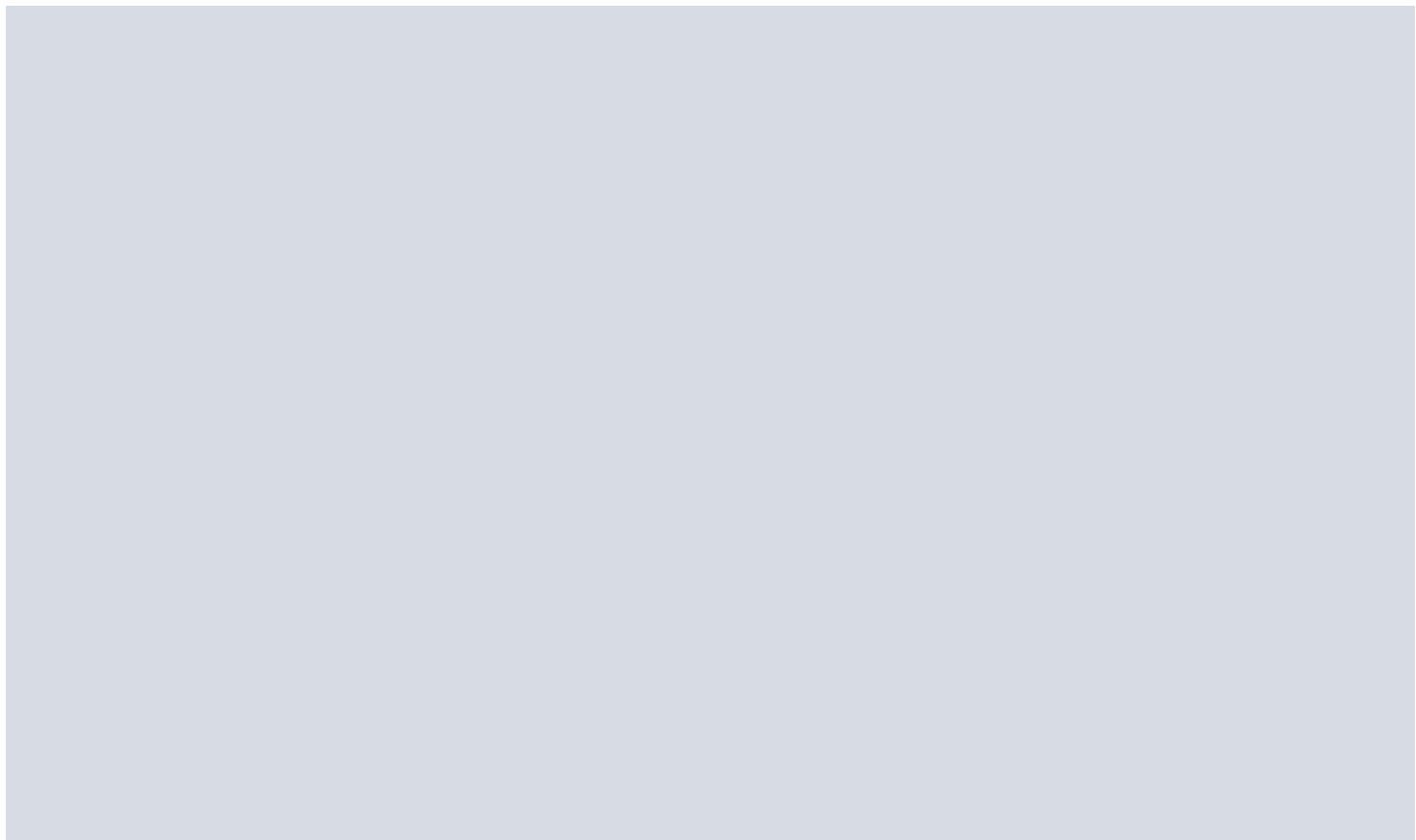
- 20 g camomile flowers
- 980 ml drinking water

Add hot but not boiling water to the camomile.

Allow to cool down in a covered pot.

Administer 3 times daily the amount of one tablespoon per animal orally (with blossoms).

The tea can be poured on the feed or provided in a trough.



Respiratory Problems

45

Housing
Management
Treatment



Respiratory Problems – Introduction

Respiratory problems are **most common** in finishing pigs, but can affect all age groups.

Problems can start with mild **symptoms** such as sneezing and discharge from the eyes, progressing to coughing and conjunctivitis, lung damage, reduced growth and even death.

Respiratory problems are **multifactorial diseases** and can be triggered by many causes.

Most often pathogens are involved. Different types of viruses and bacteria can colonise different parts of the respiratory tract. Most pathogens are harmful only if the **immune system** is not able to react properly.

Housing and management decisions may strengthen or weaken pigs' immune systems and decrease or increase the pathogen load.

Why are respiratory problems relevant?

Pigs are not only irritated by ocular discharge but sneezing, conjunctivitis (red eyes) and coughing are also painful conditions.

Respiratory problems are also relevant to the farmer for economic reasons:

- Reduced feed intake and growth rate result in impaired feed conversion rate
- Increased mortality
- Treatment costs

Bad environmental conditions, as one origin of respiratory problems in pigs, can also affect the farmer's health and job satisfaction.

Respiratory Problems – Introduction

How to recognise problems?



- 1.+2. **Normal, healthy eye and nose** – bright, no discharge, not sunken, conjunctiva not visible.
3. **«Tear staining»**– increased production of tears caused by irritation of the eye (e.g. draught, dust, foreign body, infectious agent) or stress.
4. **«Red eyes»** – conjunctivitis (red, swollen conjunctiva) caused by prolonged irritation of eye.
5. **«Rhinitis atrophicans»** – infectious disease causes distorted / shortened snout (skin folds on nose), possibly bloody discharge.

Check	Measures
Can you smell ammonia? Do your eyes or nose burn during the daily routine work?	<ul style="list-style-type: none">✓ If bedding or animals are dirty with faeces:<ul style="list-style-type: none">• Improve urine drainage.• Increase frequency of dung removal.• Improve possibilities for mechanisation of dung removal.✓ Avoid pens with only deep litter in summer. Such systems produce additional heat and do not allow cooling.✓ Check and improve natural and /or mechanical ventilation.✓ Increase access to outside run or outdoor area.
Is humidity appropriate or can you see water drops along the windows and pipes?	<ul style="list-style-type: none">✓ Measure humidity. Recommended relative air humidity ranges from 60 to 80%, depending on temperature.✓ Improve ventilation.✓ Increase access to outside run or outdoor area.✓ Replace your old building with a new, naturally ventilated barn.

Respiratory Problems – All Ages

50

Check	Measures
Do suckling and weaner piglets have a suitable nest?	<ul style="list-style-type: none">✓ Measure the temperature at different points in the nest. Optimal temperature at floor level is<ul style="list-style-type: none">• 30–34 °C (first week)• 28–30 °C (until first week after weaning)• 22–27 °C (afterwards)✓ Sit down to check, if the floor is dry. If not: Improve drainage and increase amount of bedding.✓ Observe lying behaviour of piglets → p. 30. All piglets should be able to use the nest at the same time.
Do finishers and sows have an appropriate lying area?	<ul style="list-style-type: none">✓ Observe the animals to check if lying area is large enough for all animals to lie at the same time.✓ The optimal lying area is closed on three sides and has a well-drained, dry, draught-free floor.✓ Cover the lying area of younger animals to keep it warm.

Check	Measures
How many animals are within one airspace? Are different age groups together?	<ul style="list-style-type: none">✓ Maximum number of animals within one airspace should not exceed 200–300 individuals (optimum 150).✓ Recommended room volume per pig is at least 3–4 m³.✓ Avoid keeping younger animals together with older ones in the same airspace to interrupt the chain of infection.



Outdoor

- ✓ Ensure dry and draught free huts.
- ✓ Regularly provide straw to avoid dust accumulation in the hut.

Respiratory Problems – All Ages

52



An optimal lying area is clean, dry, soft, provides plenty of straw and is not dusty.

Check

**Are there layers of dust?
Are eyes and nose irritated
when working in the pig barn?**

Measures

- ✓ If feed is very dusty:
 - Consider to add oil or molasses to the ration.
 - Do not feed too finely ground particles (more than 50% of the particles smaller than 1 mm).
 - Use pellets instead of meal or add water when feeding.
- ✓ If bedding is very dusty:
 - Optimise management to achieve high quality of straw.
 - Store straw in a covered place.
 - Add regularly fresh straw to avoid very small particles.
- ✓ Ensure good natural and /or mechanical ventilation.
- ✓ Increase access to outdoor area.
- ✓ Install feeder outside of the lying area.

Why? Dust causes irritation of the respiratory tract and predisposes mucous membranes for infections. It is also a vehicle of pathogens and toxins.

Management

Respiratory Problems – All Ages

54

Check	Measures
Do you protect your herd against diseases from outside?	<ul style="list-style-type: none">✓ Prepare an isolation barn for bought-in gilts and boars in a completely separate location.✓ Use time in quarantine (6 weeks) to take samples, and to deworm and vaccinate.✓ Preferably buy gilts or weaners from one farm only.
Do you mix pigs of different sources and ages?	<ul style="list-style-type: none">✓ Mix animals as little as possible.✓ All-in-all-out system is preferable to continuous flow.
Is stocking density appropriate?	<ul style="list-style-type: none">✓ Make sure that your pig house and individual pens are not overstocked.✓ Avoid partly empty pig houses in winter, as it might get too cold.
Is a good hygienic status ensured?	<ul style="list-style-type: none">✓ Power wash and keep the pen empty for some days between batches.✓ Follow the «general hygiene guidelines» → p. 39.



First aid measures

Call your vet if one or more pigs show symptoms:

- Increased respiration rate
 - Piglets > 50 / min
 - Fattening pigs > 30 / min
 - Adult sows > 20 / min AND
- Panting/Pumping
- Fever
- High mortality (>2% within one age group)

Move pig(s) into hospital pen.

Phytherapeutic recipe against bronchitis, catarrh and digestive disorders

Administer 2.0–10.0 g thyme (dried leaves and blossoms) per animal and day. Add daily to the feed.



Vaccination is effective only, if air quality is appropriate. Vaccination can not overcome management or housing problems.

Recommended order of treatments (consult your vet):

1. Vaccination
2. Non-pharmacological treatments.
 - Phytotherapy: e.g. thyme leaves
 - Homoeopathy: remedy depending on the symptoms
3. Antibiotics and anti-inflammatory treatment of
 - a. Individual animals
 - b. Group treatment

Better: Eradicate the pathogen from your farm!

Respiratory Problems – All Ages



Long term approach

1. Identify possible causes related to feeding, management and housing
→ previous pages.
2. Identify causal pathogens by observing animals, reviewing abattoir data, taking samples and involving your vet. Require bacteriological investigation and anti-biogram.
3. If necessary vaccinate the sows. Vaccination programme should be discussed with your vet and adapted to the barn's own pathogen spectrum. Ensure correct storage and use of vaccines.
4. Eradicate diseases (e. g. PRRS/Mycoplasma) by partial or total depopulation, cleaning, disinfection and empty period of the buildings followed by repopulation with pathogen negative stock.

Respiratory Disease	Pathogen	Vaccination
EP (Porcine Ensootic Pneumonia)	<i>Mycoplasma hyopneumonia</i> (bacteria)	Suckling piglets
Influenza	Swine Influenza Virus	Sows
PRRS (Porcine reproductive and respiratory syndrome)	PRRS Virus	Sows
Porcine Circovirus Associated Disease	Porcine Circo Virus type 1 or 2	Sows or suckling piglets
APP (Porcine pleuropneumonia)	<i>Actinobacillus pleuropneumonia</i> (bacteria)	Uncommon. Possible for suckling piglets.
Atrophic rhinitis	<i>Pasteurella multocida</i> (bacteria)	Sows

Injuries

57

Skin lesions
Tail lesions
Lameness
Vulva lesions
Swellings



Skin Lesions – Introduction

59

Skin lesions range from superficial scratches to deep wounds. Such lesions originate from equipment or from social interactions. The impact for animal welfare certainly depends on the depth of the wound. However, also small scratches may act as a **gateway for pathogens** to cause infections and inflammations.



Lesions are an indicator for constant fighting in the group, as can happen in dynamic groups or if access to resources is limited.



First aid measures

- In severe cases treat open wounds with disinfecting and wound healing sprays or ointment.
- Make sure lesions were not caused by infectious diseases (e.g. erysipelas).
- Remove any sharp edges of barn equipment or flooring.
- Move severely injured pigs to hospital pen.

Skin lesions are most often the result from fighting in the group.

Skin Lesions – Piglets

60

Check

Are many injuries caused during fights at suckling?

Measures

- ✓ Check that litter size does not exceed number of functioning teats. Carry out cross fostering if necessary.
- ✓ Make sure the sow does not suffer from MMA → p. 81.



Piglets have sharp teeth with which they can cause lesions when fighting for a place at the udder, especially in large litters or if the quantity of milk is not sufficient.

Check	Measures
Is there a lot of fighting in general?	<ul style="list-style-type: none">✓ Keep mixing to a minimum. Keep groups as stable as possible.✓ Provide increased area and visual barriers – in general and especially at the time of mixing.✓ Widen passages such as from the indoor pen to the outdoor run.✓ Supply more and/or improve access to resources such as feed, water and resting area – especially at the time of mixing.✓ If each animal does not have its own feeding space (at least 33 cm for a fattening pig), feed should be provided ad libitum.✓ Rooting material, straw and roughages should be provided ad libitum.
Is there equipment in the barn which might injure pigs?	<ul style="list-style-type: none">✓ Routinely check that equipment is safely installed and without sharp edges.✓ Routinely check that floors are not slippery and slats intact.✓ Provide sufficient bedding material.

Check	Measures
Is there a lot of fighting at regrouping?	<ul style="list-style-type: none">✓ Keep groups stable throughout the production cycle.✓ Provide sufficient space, visual barriers and non slippery floors especially when regrouping unfamiliar sows.✓ Regrouping should be done on pasture, in an arena or at least in a spacious outdoor run.✓ Provide self-locking feeding stalls as protection during feeding but also as a means of escape during regrouping.



Outdoor

- ✓ Avoid keeping pigs on ground with sharp stones.
- ✓ Ensure that huts are well maintained to avoid sharp edges.

Tail Lesions – Introduction

Tail biting – and as a consequence **tail lesions** – have **serious animal welfare implications** and appear mostly in groups of weaners or finishers. Even though tail biting is more pronounced in indoor conventional housing systems, organic farming conditions or outdoor rearing does not exclude tail biting. The causal mechanisms of tail biting are not fully understood and its occurrence is difficult to control.

Tail biting is considered to be **multi-factorial** involving factors such as diet, feeding, water access, space allowance, environmental climate, environmental enrichment, bedding, rooting/foraging material, health problems, parasite infestation and a genetic disposition for high lean meat content. However, the main cause is a lack of or insufficient or not continuously available **exploratory material**.



First aid measures

- Separate biters as well as injured animals in single hospital pens.
- Treat and disinfect wounds. Painkillers and antibiotics may be necessary.
- Treat lesions of the remaining pigs with bitter tasting spray.
- Provide ad libitum roughages, concentrate feed and water to the remaining pigs.
- Provide plenty of manipulable materials such as straw, branches of bushes or trees, or soil.
- Provide salt lick.
- Keep records of tail biting.

Tail Lesions – Weaners and Finishers

64

Check	Measures
Do animals have permanent access to foraging materials?	<ul style="list-style-type: none">✓ Supply continuously foraging substrate like straw, silage or hay.✓ Regularly renew foraging substrate for increased novelty value.
Are feed and water management appropriate?	<ul style="list-style-type: none">✓ Optimise supply of amino acids and minerals.✓ Analyse feed for mycotoxins and take measures accordingly.✓ Make sure that at least 15–20% of the feed particles are larger than 1 mm and that less than 20% are smaller than 0.2 mm.✓ Check functionality and flow rate of drinkers → p. 38.
Is the environmental climate adequate?	<ul style="list-style-type: none">✓ Improve air quality (dust, ammonia, CO₂) by removing manure, reducing all sources of dust and increasing air renewal.✓ Avoid sources of draughts, especially in the resting area.✓ Avoid abrupt changes in ambient temperature resulting in cold or heat stress.

Lameness – Introduction

Lameness may occur due to several factors. Often floor type, floor surface or slats are not adequate for the specific age category and cause injuries. Lameness may also be one symptom of infectious diseases (if combined with fever and staggering) or infections of joints (e.g. *Streptococcus*). Sows can suffer from too long claws or from injuries caused after regrouping. Susceptibility for leg problems is partly heritable.

Lame sows have a higher risk to crush their piglets.



First aid measures

- Observe and if necessary separate lame animals.
- Identify the cause together with your vet and treat accordingly. Painkillers may be necessary.
- Remove any broken or sharp equipment which may injure animals.



1.



2.



3.

1. Those claws make walking very difficult and should be trimmed.
2. Too wide gaps in slatted floors hold the risk of claw injuries.
3. Too abrasive floors or standing in dung can harm claws.

Lameness – Weaners and Finishers

66

Check	Measures
Is flooring appropriate?	<ul style="list-style-type: none">✓ Use enough bedding material and select solid flooring wherever possible.✓ Check appropriate gap width, if you have concrete slatted floors.✓ Remove sharp edges on gaps, steps and doors.✓ Check that floors have good grip and are not too abrasive in the farrowing pen.✓ Clean pens regularly to avoid that pigs are standing in dung (hygiene!) and to avoid slippery floor.
Are many fatteners with more than 50 kg lame?	<ul style="list-style-type: none">✓ Use slow growing genotypes to avoid the «weak leg syndrome».✓ Reduce feed amount to slow down growth, especially for gilts.
Is tail biting a problem?	<ul style="list-style-type: none">✓ Implement measures against tail biting → p. 63. <p><i>Why? Tail lesions can lead to infections in the spine causing lameness.</i></p>

Check	Measures
<p>Is supply with minerals and vitamins ensured?</p>	<ul style="list-style-type: none"> ✓ Supply especially young sows with sufficient Ca, P, biotin, Manganese, Copper, Zinc and Vitamin D. Optimal Ca : P ratio is 1.3 : 1.
<p>Is the length of sows' claws appropriate?</p>	<ul style="list-style-type: none"> ✓ Regularly check the length and the shape of the claws. Trim also the dew claw, if necessary. ✓ Ensure sufficient (but not too much) abrasion by choosing slightly abrasive floors in the pregnant sow activity area.
<p>Are there any lame sows after regrouping?</p>	<ul style="list-style-type: none"> ✓ Carry out regrouping after weaning and/or mating on pasture (or at least on an outdoor run with good grip). ✓ Better: Keep stable groups throughout the production cycle.
<p>Is lameness a constant problem?</p>	<ul style="list-style-type: none"> ✓ Record the identity and the genetic background of the affected animals. ✓ Select for lines with good leg health.

Lameness – All Ages

68



Outdoor

- ✓ Avoid keeping pigs on ground with sharp stones.
- ✓ Avoid keeping pigs on poorly drained soils where they often stand in mud.
- ✓ Flatten ridged field areas around hut entrances and feeding areas in winter to minimise risk from injury associated with frozen, uneven ground.



Very frequent standing in dung or mud favours infections of the claws.

Vulva Lesions – Introduction

Vulva lesions occur in situations where sows have to fight for restricted resources. Mostly they happen at feeding, if the feeding place is not protected from behind.

The most efficient way to reduce vulva lesions is to install self-locking feeding stalls, what is possible in- and outdoors.

Vulva lesions are painful and may lead to infections and subsequent difficulties at farrowing.



1.



2.



3.

- 1.+2. Different scarring consequences of bitten vulvas.
3. Self-lockable feeding stalls are the best way to prevent bitten vulvas.

Vulva Lesions – Sows

70

Check	Measures
Are there sufficient and appropriate feeding places?	<ul style="list-style-type: none">✓ If you feed all sows together:<ul style="list-style-type: none">• Provide at least one feeding place per sow.• Provide (self-)lockable feeding stalls.
Is your electronic sow feeder lockable?	<ul style="list-style-type: none">✓ Use an electronic sow feeder which protects the sow within and allows forward exit. Make sure the closing and opening speed of the sow feeder is properly programmed.
Are the sows occupied?	<ul style="list-style-type: none">✓ Provide sufficient roughage to ensure satiety of the restrictively fed sows.✓ Provide foraging and rooting material (straw, earth etc.).

Swellings – Introduction

Severe **swellings** on the legs (up to the size of a small apple) mostly appear between the hock and the dew claws (metatarsus).

Swellings develop as a reaction to constant lying on hard floor («cushion»). They are thus an indicator for a too hard lying area. Pigs on slatted or solid floors without, or with **insufficient, bedding material** are much more often affected than pigs which are offered a dry and soft lying area. In severe cases swellings can be painful for pigs.

In a first stage of swellings the skin becomes thicker. In a second stage a bursa (sack filled with fluid) develops. In severe cases the bursa becomes infected or is eroded (bursitis).



1.



2.



3.

1. Healthy leg.

2.+3. Swellings (bursae) often occur on the hindleg and can be painful.

Check	Measures
<p>Do pigs lie outside of the lying area?</p>	<ul style="list-style-type: none"> ✓ Provide cooling measures like showers, wallows and good air ventilation on warm days. ✓ Provide sufficient dry bedding material. ✓ Enlarge size of the lying area, if not all pigs can rest at the same time, or decrease the number of pigs. <p><i>Why? If the climate is too hot, the pigs seek for cooling on the concrete floor. This may though reduce their welfare, as the concrete floor provides a hard surface.</i></p>
<p>Can you exclude infectious causes?</p>	<ul style="list-style-type: none"> ✓ In case of frequent joint swellings and possibly other symptoms like lameness, fever, apathy and reduced appetite, check with your vet, if these symptoms are caused by infections. Possible infectious diseases are: Glassers' disease (<i>Haemophilus parasuis</i>, HPS), <i>Mycoplasma polyarthritidis</i>, infection with <i>Streptococcus suis</i>, or diamond skin disease (<i>Erysipelothrix rhusiopathiae</i>).

Other Health and Welfare Problems

73

Piglet mortality

MMA

Parasites



Piglet Mortality – Introduction

High **piglet mortality** is a serious economic and welfare problem, especially during the first 3 days post-partum with a peak within the first 24 hours independent of the housing system.



Piglet mortality is a **multifactorial** problem. The main reason for increased piglet mortality, however, is **high litter size**. In large litters, piglets are small, have low body energy reserves at birth, are competing more for colostrum and milk and hence are at risk for low growth rate or mortality.

Inappropriate management, feeding strategy, environment or maternal behaviour can significantly increase piglet mortality.

The risk of crushing increases, if the creep area is not attractive enough and the piglets do not use it for resting.

Piglet Mortality – Sows and Piglets

76

Check	Measures
Is management of sows appropriate?	<ul style="list-style-type: none">✓ Move sows to the farrowing unit at least 5 days before farrowing to reduce stress at birth.
Do sows have permanent access to nest-building materials?	<ul style="list-style-type: none">✓ Provide sufficient quantity of manipulable materials, especially straw, allowing the sow to build a nest for at least 3 days before the expected farrowing date. <p><i>Why? Sows that can perform nest-building activity are calmer, have shorter duration of farrowing and are less at risk to lay on their piglets.</i></p>
Is the farrowing pen appropriate for piglets?	<ul style="list-style-type: none">✓ Provide a readily accessible creep area protected from draught where all piglets can lie on deep, dry and clean bedding. Optimum temperature in the creep area at floor level is:<ul style="list-style-type: none">• 30–34 °C (first week)• 28–30 °C (until weaning)✓ If necessary, install inclined walls with a gap at floor level or rails or bars to avoid crushing by the sow.

Check	Measures
<p>Is the farrowing pen appropriate for sows?</p>	<ul style="list-style-type: none"> ✓ Maintain the farrowing area clean and dry, provide a sufficient amount of straw. ✓ Check temperature and other potential stress factors during farrowing. Temperature should not exceed 24 °C.
<p>Is breeding and breeding programme of sows appropriate?</p>	<ul style="list-style-type: none"> ✓ Select for sows with smaller (less than 14 piglets) but more homogenous litters. ✓ Cull old sows, if piglet mortality is high (above 20%). ✓ Choose lines with good maternal abilities (e.g. nest building, careful lying down, reaction to piglets).
<p>Are your sows in a good health state ?</p>	<ul style="list-style-type: none"> ✓ Make sure your sows are not lame, not too fat and don't have ectoparasites like mange. <p><i>Why? When piglets get crushed, they start to scream. If the sow can react immediately, most piglets will survive. Ectoparasites lead to restlessness and reduced milk production.</i></p>

Piglet Mortality – Sows and Piglets

78

Check

Do you monitor farrowing and help newborn piglets to get colostrum after birth?

Measures

- ✓ If a piglet does not drink right after birth, give some drops of colostrum directly into its mouth, and administer glucose solution.
- ✓ The strongest piglets can be shut away into the creep area for 2–3 hours after they have had colostrum in order to allow sufficient uptake by weaker piglets.
- ✓ Make sure all piglets find the creep area quickly to prevent hypothermia. If necessary, put them repeatedly into the creep area.
- ✓ Make sure your presence and your intervention on the piglets do not disturb the sow.

Why? Monitoring of farrowing usually has a positive effect on the survival rate of piglets, but it may be detrimental and lead to prolonged farrowing, if it perturbs the sow.

Check

Are there enough productive teats? Can piglets reach the teats in the upper row?

Measures

- ✓ Check the number of productive teats. The number of functional teats should be larger than the number of piglets.
- ✓ If necessary, equalise litter sizes by cross-fostering between 12 and 36 hours after farrowing (optimum 24 hours) to let piglets drink colostrum from their dam and to avoid rejection by the adoptive sow.
- ✓ If fostering is impossible or not sufficient, add milk replacer in bowls in the farrowing pen.



An optimal farrowing pen or hut meets the needs of both the sow and the piglets.



Outdoor

- ✓ Provide an insulated hut of appropriate size for the sow to warm the airspace, especially when piglets are small.
- ✓ Ensure that the farrowing hut is dry and draught proof and that the interior is protected from strong winds (by downwind orientation of the entrance).
- ✓ Provide an adequate depth of clean, dry straw bedding.
- ✓ Ensure that bedding is spread evenly over the floor of the hut and relatively flattened when farrowing nears.
- ✓ Avoid excessive disturbance of the sow during farrowing.
- ✓ Use individual farrowing paddocks to prevent disturbance from other sows.
- ✓ Use good fencing to keep predators away.
- ✓ Block any holes between the hut walls and the ground with mud.
- ✓ Use a curtain at the doorway to reduce heat loss.
- ✓ Use a «fender» to keep the piglets at the beginning in the hut. Remove it, when the piglets start to jump at around 7 days of age, so that they can socialise.

MMA – Introduction

Mastitis - Metritis - Agalactia (MMA) is a complex of mastitis (inflammation of the udder), metritis (inflammation of the uterus) and agalactia (insufficient or absent milk production). But the three disorders may also occur separately. The MMA complex is economically important, since it can cause **high losses of piglets**.

MMA is caused by infections (mostly *E.coli*, but also *Streptococci* and *Staphylococci*), but problems in housing, management and feeding are predisposing factors. Individual records are important to detect sows that are more prone to MMA.



First aid measures

Call your vet if:

- Sows show temperature above 39.3 °C at 12 to 24 hours after farrowing.
- Together with symptoms like loss of appetite, lying on the udder, hot and red udder, purulent vaginal discharge and apathy after farrowing.

A treatment with antibiotics, analgesics and anti-inflammatory might be necessary.

Check	Measures
Do you detect symptoms of MMA early?	<ul style="list-style-type: none">✓ Observe birth, but intervene only if necessary.✓ Check rectal temperature twice daily for 3 days after farrowing and check for other symptoms of acute MMA.
Is a good hygienic status ensured?	<ul style="list-style-type: none">✓ Follow the «general hygiene guidelines» as described → p. 39.✓ Clean sows thoroughly before bringing them to the farrowing pen.✓ If you assist during farrowing, clean the sow's vulva and use disposable gloves and lubricant, or clean and disinfect hands and arms thoroughly.✓ Clean the pen. Especially remove remains of the afterbirth after farrowing.

Check

Are feed and water supply adapted to farrowing sows?

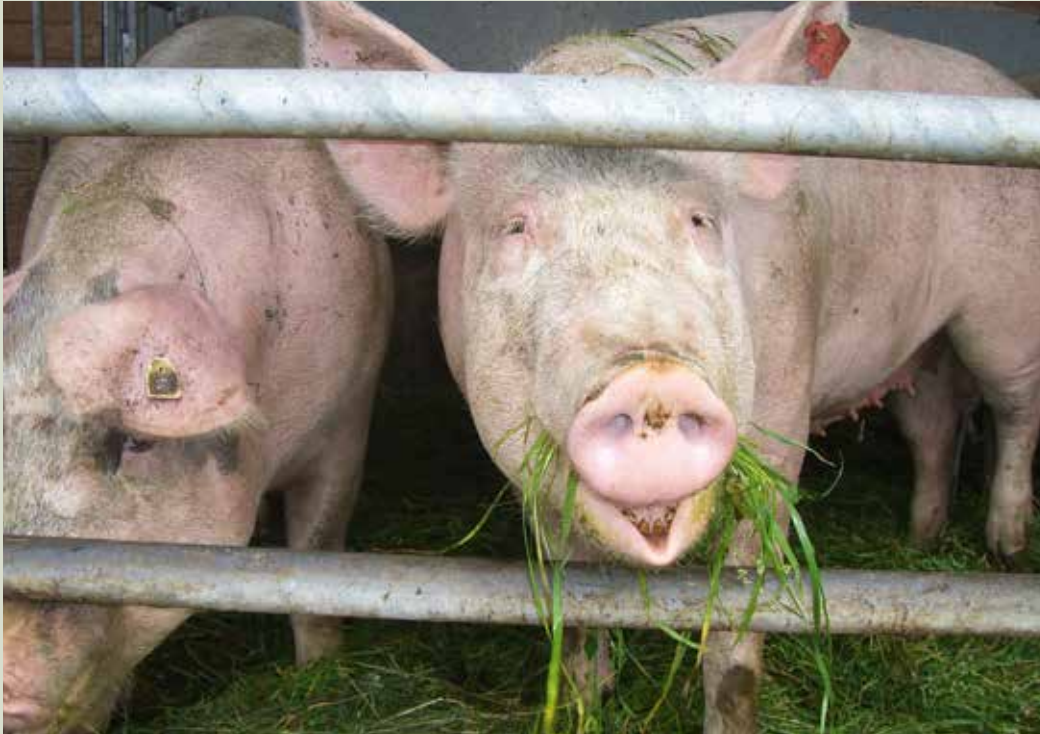
Measures

- ✓ Reduce the concentrate feed rate towards farrowing to 1–1.5 kg per day.
- ✓ Reduction of calcium 5–8 days before until 2 days after farrowing can help to acidify urine and reduce the risk for infections of the urinary tract.
- ✓ Provide enough roughage and water during pregnancy.
- ✓ Provision of Glauber's salt (60 g per 100 kg body weight) or flaxseed (50 g per 100 kg body weight) twice a day around farrowing has a laxative effect. Also other natural laxative feed additives may be used, if they are compatible with organic standards.
- ✓ After farrowing offer water also in the trough.
- ✓ Ensure a flow rate of drinkers of 2.5–3 l per min in the farrowing pen.

Why? Measures to avoid constipation reduce the likelihood of MMA.

MMA – Sows

84



Ad libitum roughages like silage or fresh grass are essential during gestation and especially before birth to prevent constipation.

Parasites – Introduction

Infestations with **parasites** may seriously affect the welfare of the animals and cause severe economic losses, although it is not obvious: lesions in the respiratory or digestive tract, poorer feed conversion since parasites divert nutrients, anaemia, discomfort, pain, impairment of the immune system or skin lesions in case of ectoparasites.

Pigs can get infected with **endoparasites** by ingestion of parasite eggs (e.g. large roundworm) or larvae, or ingestion of an intermediate host (e.g. earth worms), passage of larvae through the skin



or the mammary glands and colostrum.

Control of endoparasites aims at a low level of infestation, as a complete removal of the parasites is often not possible.

Ectoparasites such as Mange (mites) and lice are transferred directly from animal to animal.



First aid measures

- If pigs show signs of infestation with gastrointestinal parasites like diarrhoea, constipation, respiratory problems or runts, take fresh faeces samples (ideally directly from the rectum or still warm from the floor) and send them to a specialised laboratory. Results will help you and your vet to decide, if and with which deworming agent you should treat.

Ectoparasites like mange cause discomfort and restlessness.



Long term approach

- Milk spots on the liver of a high proportion of the slaughtered pigs indicates infestation with large roundworms (*Ascaris suum*). In this case, consider treatment of the herd. Large roundworms can also be present in the herd, if findings at the slaughterhouse are inconspicuous.
- If pigs show signs of ectoparasites like grey, crusty areas around ears, legs and tail and a lot of scratching, discuss with your vet a systematic programme to eradicate mange or lice. Mange eradication is relatively easy, if it is done systematically.

Mange eradication

- Choose a date when only few animals are on the farm.
- Treat all animals twice with e.g. «Ivermectin» in an interval of two weeks.
- Be very careful when buying new animals. Put new animals in quarantine and treat them if necessary.
- Mange mites survive only a few days without animals (3–4 days if humid, less if dry). Therefore, washing or disinfection of the pen is not necessary to remove the parasite.
- Mites causing mange in dogs and cats are not a danger for pigs, as these mites belong to another species.

Check	Measures
Do you manage your herd as a closed herd?	<ul style="list-style-type: none">✓ Try to keep your herd as closed as possible, breed your own replacement sows.✓ Newly bought animals should be selectively dewormed, based on faecal analyses, inspected for lice and mange and treated accordingly before integrating them into the herd to prevent the introduction of new parasites.
Do you clean pens regularly?	<ul style="list-style-type: none">✓ Pens, especially farrowing pens, should be thoroughly cleaned with high-pressure cleaners between batches and left empty for at least one day.✓ Daily cleaning should be done, removing at least faeces. Farrowing pens should be kept dry. Deep litter systems should also be cleaned. Cleaning routine should begin with youngest groups and end with the oldest. <p><i>Why? Faeces may transmit parasites. Moisture facilitates the survival of eggs and the development of some larvae.</i></p>

Check	Measures
Do you wash sows before transfer to the farrowing pen or hut?	✓ Careful washing of the sows with soap before bringing them to the farrowing pen or hut removes adult ectoparasites and eggs of lice.
Do you compost pig manure before utilisation?	✓ Manure from pigs should be composted before spreading it on the field to interrupt infectious cycles.



Outdoor

- ✓ Regular rotation of paddocks reduces surviving of eggs and larvae over time. If possible, include pigs in a crop rotation, so that pigs move to fresh ground at least once per year and the time-lag before re-occupation is around 5 years.
- ✓ Rest from pigs moist areas like wallows for some time as they are often a reservoir of parasite eggs and larvae.
- ✓ Rotate feeding spots regularly. This will reduce the parasite load in one place. Avoid feeding on contaminated ground and consider trough feeding.

Sources

Page 19: Feeding / Energy curve. Adapted according to: Fütterungsfibel ökologische Schweinehaltung;

URL: http://www.lfl.bayern.de/mam/cms07/publikationen/daten/informationen/p_34976.pdf

Page 20: Body condition score of the sow. Adapted according to Assurewel; URL: <http://www.assurewel.org/pigs/bodycondition>

Page 30: Laying behavior of piglets. Adapted according to: De Baey-Ernsten, 1997.

Page 38: DLG Merkblatt 351; URL: http://www.dlg.org/fileadmin/downloads/merkblaetter/dlg-merkblatt_351.pdf

Pictures

Mirjam Holinger: pages 4, 5, 9 [2], 13, 24, 26, 30, 42, 59, 60, 65, 69 [1,2], 71 [2,3]

Christine Leeb: pages 14, 16, 25, 34 [1], 38 [2], 48, 71 [1], 79, 84

Barbara Früh: pages 75, 69 [3], 85 [2]

Helena Mejer: pages 31, 85 [1]

Henri Flageul: page 9 [1]

Jürgen Herrle: page 52

Denise Knop: page 68

Florence Maupertuis: page 34 [2]

Gwendolyn Rudolph: page 38 [1]

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Project partners:

BIO-I, Bioinstitut (Institute for Organic Agriculture and Sustainable Landscape Management), Krizkovskeho 8, 771 47 Olomouc, CZ, www.bioinstitut.cz;
Jiri Urban (jiri.urban.bio-i@seznam.cz)

BOKU (University of Natural Resources and Life Sciences), Division of Livestock Sciences, Gregor-Mendel Strasse 33, 1180 Vienna, AT, www.boku.ac.at;
Christine Leeb (christine.leeb@boku.ac.at)

CRA-SUI (Consiglio per la Ricerca e la sperimentazione in agricoltura), Via Nazionale, 82, 00184 Roma, IT, www.entecra.it;
Davide Bochiocchio (davboch@hotmail.com)

DJF-AU (Aarhus University, Department of Animal Science), Blichers Allé 20, PO box 50, DK-8830 Tjele, anis.au.dk;
Tine Rousing (Tine.Rousing@agrsci.dk)

FiBL (Research Institute of Organic Agriculture), Ackerstrasse 113, 5070 Frick, CH, www.fibl.org; Barbara Früh (barbara.frueh@fibl.org)

Fli (Friedrich-Loeffler-Institut), Institute of Animal Health and Animal Husbandry, Dörnbergstrasse 25/27, 29223 Celle, DE, www.fli.bund.de;
Sabine Dippel (Sabine.Dippel@fli.bund.de)

IAS (Institute of Animal Science), Přátelství 815, 10400 Prague, CZ, www.vuzv.cz; Gudrun Illmann (gudrun.illmann@vuzv.cz)

INRA (Institut National de Recherche Agronomique), Domaine de la Prise, 35590 Saint-Gilles, F, www.inra.fr; Armelle Prunier (Armelle.Prunier@rennes.inra.fr)

NU (Newcastle University, School of Agriculture, Food and Rural Development), Agriculture Building, Newcastle upon Tyne, NE1 7RU, UK, www.ncl.ac.uk;
Gillian Butler (gillian.butler@newcastle.ac.uk)

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Authors and Review: Mirjam Holinger (FiBL), Hannah Ayrle (FiBL), Davide Bochicchio (CRA-SUI), Gillian Butler (NU), Sabine Dippel (FLI), Sandra Edwards (NU), Diane Holmes (NU), Gudrun Illmann (IAS), Christine Leeb (BOKU), Florence Maupertuis (Chambre d'agriculture de Loire Atlantique, France), Michala Melišová (IAS), Armelle Prunier (INRA), Tine Rousing (DJF-AU), Gwendolyn Rudolph (BOKU) and Barbara Früh (FiBL)

Editors: Mirjam Holinger, Barbara Früh and Gilles Weidmann (FiBL), Switzerland

Design: Helen James, jamesdesign.ch, and Sybil Weishaupt, weishaupt-design.ch, Westquai 2, CH-4019 Basel, Switzerland

Layout: Brigitta Maurer (FiBL), Switzerland

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